



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/534,835	05/13/2005	Hidenobu Hamada	2005-0795A	6722

513 7590 02/12/2007  
WENDEROTH, LIND & PONACK, L.L.P.  
2033 K STREET N. W.  
SUITE 800  
WASHINGTON, DC 20006-1021

EXAMINER
----------

ROJAS, OMAR R

ART UNIT	PAPER NUMBER
----------	--------------

2874

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/12/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

Application No.

10/534,835

Applicant(s)

HAMADA, HIDENOBU

Examiner

Omar Rojas

Art Unit

2874

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 28 December 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-123 is/are pending in the application.
- 4a) Of the above claim(s) 8-13 and 15-123 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on May 13, 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 05/13/2005
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☒ Other: Detailed Action

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election with traverse of the species of the first embodiment corresponding to claims 1-7 and 14 in the reply filed on December 28, 2006 is acknowledged. The traversal is on the ground(s) that the examiner did not "identify the separate species by the groups of claims which correspond to the claims considered to not have the same or corresponding technical feature". This is not found persuasive because grouping of the claims according to the separate species is not considered a necessary requirement when holding lack of unity. The separate species lacking unity were adequately identified in the previous restriction requirement according to the different embodiments shown in the drawing figures. Furthermore, each of the identified species contains a technical feature not found in any of the other species (i.e., the embodiment of Figure 2 includes an O/E converter, 221, that is not found in the embodiment of Figure 1). Due to the unusually large number of claims in the application, i.e., more than 100, it was both fair and appropriate to identify the separate species according the drawing figures.

The requirement is still deemed proper and is therefore made FINAL.

2. Claims 8-13 and 15-123 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention and/or species, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on December 28, 2006.

### ***Priority***

3. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

***Information Disclosure Statement***

4. The prior art documents submitted by Applicant(s) in the Information Disclosure Statement(s) ("IDS") filed on May 13, 2005 have all been considered and made of record (note the attached copy of form(s) PTO-1449).

***Specification***

5. The disclosure is objected to because of the following informalities: On page 88, lines 10-14, the length direction is defined as being parallel to both the y-axis and the z-axis. In Figure 1A, however, the length direction "L" is parallel only to the z-axis and is orthogonal to the y-axis.

Appropriate correction is required.

6. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. **Claims 1-4 and 14 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Patent No. 4,087,159 to Ulrich ("the '159 patent") cited in the IDS.**

Art Unit: 2874

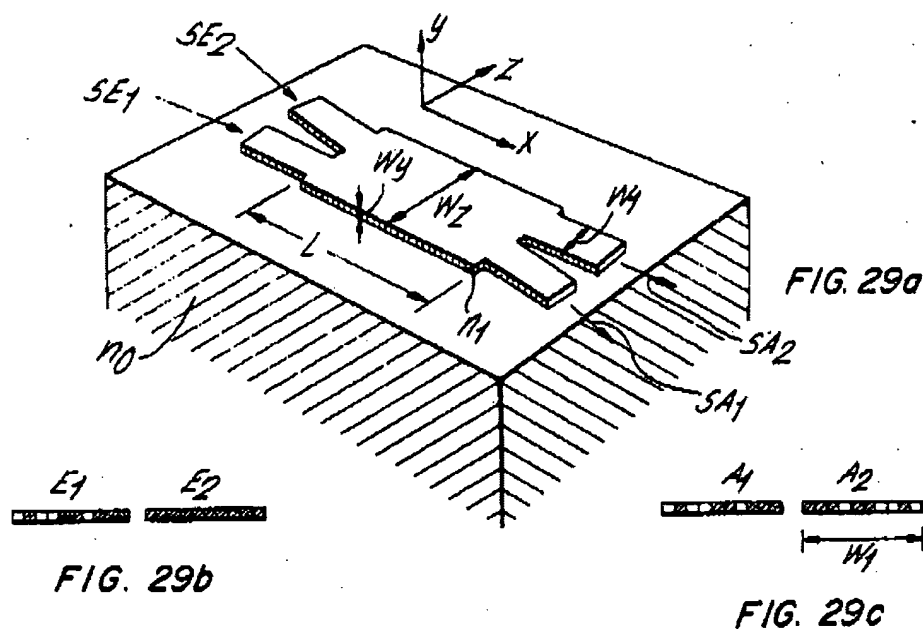
*In re* claim 1, the '159 patent shows in Figure 29 an optical device that connects, by a signal beam, between an externally inputted input signal and an output signal to be outputted (column 33, lines 14-31), the optical device comprising:

an optical transmission line being sheet-form and including a refractive index distribution such that a highest refractive index part is provided in a direction of a thickness of the sheet and a refractive index does not increase with distance from the highest refractive index part in the direction of the thickness (column 33, lines 21-32),

wherein a signal beam corresponding to the input signal is made incident on the optical transmission line as an incident beam (column 33, lines 44-52),

wherein inside the optical transmission line, the incident beam is transmitted, in a direction of a length that is orthogonal to the direction of the thickness, in multiple modes having a plurality of eigenmodes in a direction of a width that is orthogonal to both the direction of the length and the direction of the thickness, and an exiting beam is generated by the plurality of eigenmodes interfering with each other in the direction of the length (column 22, lines 28-56), and

wherein the exiting beam is made to exit from the optical transmission line, and the output signal corresponding to the exiting beam is outputted (column 34, lines 6-11). Figure 29 of the '159 patent is reproduced below.



*In re* claim 2, the optical transmission line described by the '159 patent inherently has a length that can be expressed by a function of a difference between a propagation constant of a 0th-order mode excited in the direction of the width of the optical transmission line and a propagation constant of a primary mode because the transmission line of the '159 patent has the same physical structure and operates in the same manner to that claimed.

*In re* claim 3, the optical transmission line described by the '159 patent inherently has a length that can be expressed by a function of a basic mode width in the direction of the width, the highest refractive index in the direction of the thickness and a wavelength of a beam transmitted in the multi-mode optical transmission line because the transmission line of the '159 patent has the same physical structure and operates in the same manner to that claimed.

Art Unit: 2874

*In re* claim 4, the recited refractive index distribution is clearly shown in Figures 12a-12f of the '159 patent.

*In re* claim 14, the device shown in Fig. 29 of the '159 patent operates as a 1 x 2 splitting device and includes:

an incident surface  $SE_1$  for making the incident beam incident;  
an exit surface  $SA_1/SA_2$  for making the exiting beam exit, and  
the size in the direction of the length is inherently a value that satisfies the claimed expression because the transmission line of the '159 patent has the same physical structure and operates in the same manner to that claimed.

**9. Claims 1-4 and 14 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by B. Li et al., IEEE Photonics Technology Letters, May 1999, Vo. 11, No. 5, pages 575 to 577 ("the Li article") cited as Document "AP" in the IDS.**

*In re* claims 1, 2, and 4, the claimed invention is clearly described on pages 575-577 of the Li article.

*In re* claim 3, the optical transmission line described by the Li article inherently has a length that can be expressed by a function of a basic mode width in the direction of the width, the highest refractive index in the direction of the thickness and a wavelength of a beam transmitted in the multi-mode optical transmission line because the transmission line of the Li article has the same physical structure and operates in the same manner to that claimed.

Art Unit: 2874

*In re* claim 14, the device described by the Li article operates as a 1 x 2 splitting device and includes:

an input waveguide for making the incident beam incident;

an output waveguide for making the exiting beam exit, and

the size in the direction of the length is inherently a value that satisfies the claimed expression because the transmission line of the Li article has the same physical structure and operates in the same manner to that claimed.

***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**11. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over the '159 patent as applied to claim 4 above, and further in view of Patent No. 3,614,197 ("the '197 patent") also cited in the IDS.**

*In re* claim 5, the '159 patent only differs from the claim in that a refractive index distribution that changes substantially along a quadratic function is not shown. The '197 patent, on the other hand, shows in Figure 4(A) a refractive index distribution that changes substantially along a quadratic function. The motivation for combining the '197 patent with the '159 patent is mentioned at column 3, lines 69-74 of the '197 patent (i.e., less light distortion). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to



obtain the invention specified by claim 5 in view of the '159 patent combined with the '197 patent.

**12. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over the Li article as applied to claim 4 above, and further in view of the '197 patent.**

*In re* claim 5, the Li article only differs from the claim in that a refractive index distribution that changes substantially along a quadratic function is not shown. The '197 patent, on the other hand, shows in Figure 4(A) a refractive index distribution that changes substantially along a quadratic function. The motivation for combining the '197 patent with the Li article is mentioned at column 3, lines 69-74 of the '197 patent (i.e., less light distortion). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to obtain the invention specified by claim 5 in view of the Li article combined with the '197 patent.

**13. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over the '159 patent as applied to claim 4 above, and further in view of Publication No. US 2003/0215203 A1 to Lock et al. ("the Lock publication").**

*In re* claims 6 and 7, the '159 patent only differs from the claims in that the optical transmission line of the '159 patent is not made of polysilane and the refractive index distribution is not provided by an oxygen concentration distribution when the polysilane is cured. The Lock publication, on the other hand, describes in paragraph [013] an optical transmission line made of polysilane, and a refractive index distribution is provided by an oxygen concentration distribution when the polysilane is cured. The motivation for combining the Lock publication with the '159 patent is mentioned at paragraphs [021]-[022] of the Lock publication (i.e., high thermal stability). Therefore, it would have been obvious to one of ordinary skill in the art at the

Art Unit: 2874

time of the claimed invention to obtain the invention specified by claims 6 and 7 in view of the '159 patent combined with the Lock publication.

**14. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Li article as applied to claim 4 above, and further in view of the Lock publication.**

*In re* claims 6 and 7, the Li article only differs from the claims in that the optical transmission line of the Li article is not made of polysilane and the refractive index distribution is not provided by an oxygen concentration distribution when the polysilane is cured. The Lock publication, on the other hand, describes in paragraph [013] an optical transmission line made of polysilane, and a refractive index distribution is provided by an oxygen concentration distribution when the polysilane is cured. The motivation for combining the Lock publication with the Li article is mentioned at paragraphs [021]-[022] of the Lock publication (i.e., high thermal stability). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to obtain the invention specified by claims 6 and 7 in view of the Li article combined with the Lock publication.

#### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Omar Rojas whose telephone number is (571) 272-2357. The examiner can normally be reached on Monday-Friday (12:00PM-8:00PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rod Bovernick, can be reached on (571) 272-2344. The official facsimile number for regular and After Final communications is (571) 273-8300. The examiner's RightFAX number is (571) 273-2357.

Art Unit: 2874

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Omar Rojas  
Patent Examiner  
Art Unit 2874

or  
January 25, 2007



SUNG PAK  
PRIMARY EXAMINER